What is claimed is:

1. A method for quantifying the risk of serious arrhythmias, sudden cardiac death, or other modes of death and all-cause mortality events in mammals, comprising:

obtaining ECG data, the ECG data comprising at least one heart beat cycle;

processing the ECG data to detect patterns that predict a risk of sudden cardiac death, other modes of death, and all-cause mortality, the processing being performed without the use of data from other measuring devices or invasive procedures, the ECG data including at least 12 dimensional dynamical phase space densities, the processing including using a time interval to quantify the risk of sudden cardiac death, other modes of death, and all-cause mortality; and

creating a 3-D phase space plot from processed ECG data, the 3-D phase space plot visualization providing a visual indication of regions of a heart that include abnormal heart tissue,

wherein the at least one heart beat cycle corresponds to a vector sum electrical activation pathway through the heart, and

wherein the vector sum electrical activation pathway is used with time information associated with the at least 12 dimensional dynamical space density to determine the risk of sudden cardiac death, other modes of death and all-cause mortality.

2. The method of claim 1, wherein the predetermined time interval is at least 50 seconds and typically from 100 to 700 seconds.

3. The method of claim 1, further comprising using at least 12 variables corresponding to the at least 12 dimensional dynamical space density as terms that are selected in nonlinear combinations selected from a list comprising sin, cos, cos h, sin h, Rossler functions, product, division, addition, subtraction, Gaussian, exponential functions and become candidates based on the genetic operators selected from a second list comprising inheritance, mutation, selection, and crossover.

4. The method of claim 3 further comprising:

generating offspring function combinations that are evaluated and optimized by freezing all but one variable;

optimizing an unfrozen variable to reduce an absolute error of a model;

optimizing in a sequence, the other variables until all at least 12 variable have a lowest error;

using a fitness function to determine a solution having a lowest absolute error; and

continuing until a highest-ranking solution's fitness has reached a plateau such that successive iterations no longer produce better results.

5. The method of claim 4, further comprising:

using the at least 12 variables in a genetic algorithm; and

modeling, using the at least 12 variables to link sudden cardiac death risk, other modes of death and all-cause mortality to the ECG.

6. The method of claim 3, wherein the at least 12 dimensional phase space information from the heart can be machine learned based on mining and linking of the ECG data to associated patient outcomes.

7. The method of claim 6, further comprising associating other biomarkers to the at least 12 dimensional phase space information.

8. The method of claim 7, further comprising associating an effectiveness of patient therapies that includes using the model results to guide a treatment or intervention.

9. The method of claim 1, further comprising substituting other physiological data for the ECG data, the other physiological data comprising one of blood pressure and pulse oximetry.

10. A method for displaying risk of cardiovascular or all-cause mortality event in a mammalian heart, comprising:

obtaining ECG data for the heart, the ECG data comprising at least one heart beat cycle;

processing the ECG data to detect an abnormality in the heart and the risk for sudden cardiac death (SCD) and all-cause mortality without use of other measuring devices or invasive procedures; and

using phase information to determine a location of the abnormality to visually display the potential to be arrhythmogenic,

wherein the abnormality in the heart is detected within a time interval of between 50 seconds and 700 seconds,

wherein the heart beat cycle corresponds to a vector sum electrical activation pathway through the heart, and the pathway is used with at least 12 dimensional dynamical space density time information to determine the risk of sudden cardiac death and all-cause mortality.

11. The method of claim 10, the step of processing the ECG data comprising creating an at least 12 dimensional phase space diagram from the ECG data, and using the at least 12 dimensional phase space diagram to detect the risk of sudden cardiac death and all-cause mortality.

12. The method of claim 11, further comprising modeling the at least 12 dimensional phase space information on a reconstructed 3D model of the heart to visually display where the abnormality is located in the heart and to display a potential of the abnormality to be arrhythmogenic.

13. The method of claim 10, further comprising using at least 12 variables corresponding to the at least 12 dimensional dynamical space density as terms that are selected in nonlinear combinations selected from a list comprising sin, cos, cos h, sin h, Rossler functions, product, division, addition, subtraction, Gaussian, exponential functions and become candidates based on the genetic operators selected from a second list comprising inheritance, mutation, selection, and crossover.

14. The method of claim 13, further comprising:

generating offspring function combinations that are evaluated and optimized by freezing all but one variable;

optimizing an unfrozen variable to reduce an absolute error of a model;

optimizing in a sequence, the other variables until all at least 12 variable have a lowest error;

using a fitness function to determine a solution having a lowest absolute error; and

continuing until a highest-ranking solution's fitness has reached a plateau such that successive iterations no longer produce better results.

15. The method of claim 13, further comprising:

using the at least 12 variables in a genetic algorithm; and

modeling, using the at least 12 variables, to link sudden cardiac death risk, other modes of death and all-cause mortality to the ECG.

16. The method of claim 13, wherein the at least 12 dimensional phase space information from the heart can be machine learned based on mining and linking of the ECG data to associated patient outcomes.

17. The method of claim 10, further comprising associating other biomarkers to the at least 12 dimensional phase space information.